

**BEFORE THE
PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA**

DOCKET NO. 2019-182-E

In the Matter of:)
)
South Carolina Energy Freedom Act)
(H.3659) Proceeding Initiated Pursuant)
to S.C. Code Ann. Section 58-40-20(C):)
Generic Docket to (1) Investigate and)
Determine the Costs and Benefits of the)
Current Net Energy Metering Program and)
(2) Establish a Methodology for Calculating)
the Value of the Energy Produced by)
Customer-Generators)

**REBUTTAL TESTIMONY OF
BRADLEY HARRIS FOR DUKE
ENERGY CAROLINAS, LLC AND
DUKE ENERGY PROGRESS, LLC**

I. INTRODUCTION AND SUMMARY

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Bradley (“Brad”) Harris, and my business address is 411 Fayetteville Street, Raleigh, North Carolina 27601.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Duke Energy Corporation as a Rates and Regulatory Strategy Manager, where I am responsible for managing strategic rate design reforms in the Carolinas and Florida.

Q. DID YOU PREVIOUSLY FILE DIRECT TESTIMONY IN THIS PROCEEDING?

A. Yes, I did.

Q. ARE YOU INCLUDING ANY EXHIBITS IN SUPPORT OF YOUR REBUTTAL TESTIMONY?

A. Yes. Harris Rebuttal Exhibit 1 shows the work papers for my Embedded Cost-Shift Study (the “Embedded Cost to Serve Studies”) and Harris Rebuttal Exhibit 2 shows the work papers for my Marginal Cost-Shift Studies (“Marginal Cost Studies”).

Q. WERE THESE EXHIBITS PREPARED BY YOU OR AT YOUR DIRECTION AND UNDER YOUR SUPERVISION?

A. Yes.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY IN THIS PROCEEDING?

A. The purpose of my rebuttal testimony is to respond to certain items raised in the direct testimony of South Carolina Office of Regulatory Staff’s (“ORS”) Witness

1 Horii related to (i) net energy metering (“NEM”) methodology, and (ii) items
2 included in the Embedded Cost to Serve Studies and the Marginal Cost Studies.
3 Additionally, I respond to SCCCL/SACE/UF/Vs/SEIA/NCSEA Witness Beach’s
4 recommendation that a narrow cost-benefit methodology be used by the Public
5 Service Commission of South Carolina (the “Commission”) in evaluating NEM
6 programs.

7 **Q. PLEASE SUMMARIZE YOUR REBUTTAL TESTIMONY?**

8 A. Duke Energy Carolinas, LLC (“DEC”) and Duke Energy Progress, LLC (“DEP”)
9 (DEC and DEP are herein referred to collectively as the “Companies”) discussed
10 the Embedded Cost to Serve Studies and Marginal Cost Studies in the direct
11 testimony submitted in this docket that evaluate the current NEM programs (the
12 “Existing NEM Programs”) in accordance with Act 62. In evaluating cost of
13 service implications within those studies, the Companies utilized sound
14 methodologies—including a demand metric approved by the Commission—to
15 estimate the cost of service implications under Existing NEM Programs in
16 accordance with Act 62. The Companies and the ORS share many points of
17 agreement in their approach to estimating these cost of service implications, and
18 their resulting cost-shift estimates under the Existing NEM Programs are
19 substantially similar. As required by Act 62, the Commission should consider both
20 embedded and marginal cost of service perspectives when evaluating any cost-
21 shifts or subsidizations in rate designs. Evaluating both marginal and embedded
22 perspectives suggest a NEM monthly cross-subsidy of \$30-\$40 in DEC and \$30-

1 \$64 in DEP. This is consistent with the 2018 estimate of the cross-subsidy in South
2 Carolina of \$45 per month, which was described by ORS Witness Horii.

3 **II. METHODOLOGY TO VALUE NEM PROGRAMS**

4 **Q. ON PAGE 13, LINES 5 THROUGH 6, ORS WITNESS HORII NOTED**
5 **THAT THE COMPANIES “USED A FUTURE TEST YEAR (2024) FOR**
6 **THEIR EMBEDDED COS STUDIES.” IS THIS ACCURATE?**

7 A. No. As described in my direct testimony, the Embedded Cost to Serve Studies
8 utilized a test year ending December 31, 2017 because they relied on the
9 compliance cost of service (“COS”) studies from the 2018 rate cases. These COS
10 studies are the basis for the current base rates in DEC-SC and DEP-SC. Given that
11 the Embedded Cost to Serve Studies rely on a comparison between revenues and
12 costs, it is critical that both sides of the equation are based on the same data. Since
13 the base rates in effect are based on the COS studies with a 2017 test year, the same
14 studies should be used to estimate costs in the Embedded Cost to Serve Studies.
15 Similarly, I used billing and solar production meter data from 2017 to arrive at the
16 billing determinants for both the revenue reduction and costs. Billing determinants
17 are the units of measurement that are applied to charges or rates. For example, the
18 billing determinant for an energy charge is the kilowatt-hours (kWh) used by a
19 customer; the billing determinant for a customer charge is the number of customers
20 (i.e. one per bill), and the billing determinant for a demand charge is the kW used
21 by the customer. Using any alternative COS study or test year besides 2017 would
22 be inappropriate because they have not been used to set base rates.

1 **Q. DO YOU AGREE WITH ORS WITNESS HORII'S ASSERTION ON PAGE**
2 **13, LINES 8 THROUGH 9 OF HIS DIRECT TESTIMONY THAT ENERGY**
3 **USAGE AND DEMAND METRICS IN EMBEDDED COS STUDIES**
4 **COULD INCORPORATE EITHER "HISTORICAL OR FUTURE**
5 **CONDITIONS?"**

6 A. I do not agree in this context. Act 62 requires a study of "an evaluation of whether
7 customer-generators provide an adequate rate of return to the electrical utility
8 compared to the otherwise applicable rate class when, for analytical purposes only,
9 examined as a separate class within a cost of service study."¹ Since the law requires
10 customer-generators to be examined as a separate rate class, the study should use
11 the existing metrics approved by the Commission in the Companies' last base rate
12 case. Additionally, any new allocation methodology is correctly be applied to an
13 entire COS study and cannot be applied solely to any individual rate class(es).
14 Therefore, any change in allocation methodology would require a base rate case,
15 since it would change the cost allocations used to determine all of the prices in
16 DEC-SC and DEP-SC. The Companies should not base embedded costs using a
17 different metric than assigned to other rate classes since it would provide a distorted
18 picture of the analysis required by Act 62.

19

¹ S.C. Code Ann. § 58-40-20(D)(2).

1 **Q. ON PAGE 18, LINE 20, THROUGH PAGE 19, LINE 21, ORS WITNESS**
2 **HORII DISCUSSES THE DEMAND METRIC UTILIZED BY THE**
3 **COMPANIES IN THE EMBEDDED COST TO SERVE STUDIES. PLEASE**
4 **EXPLAIN WHY THE COMPANIES USED THAT DEMAND METRIC.**

5 **A.** ORS Witness Horii raised concerns related to the use of a Summer Coincident Peak
6 (“Summer CP”) allocation method. ORS Witness Horii stated “[t]his might have
7 been an appropriate way to represent how each class caused the need for generation
8 capacity a few years ago.”² Thus, he does not appear to be disagreeing with the
9 testimony of Janice Hager in Docket No 2018-319-E and 2018-318-E that the
10 Summer CP is appropriate for allocated embedded (or historical) costs. This was
11 the methodology approved by the Commission as “just and reasonable”, and (as
12 previously discussed) it would be inappropriate to set a new methodology outside
13 of a base rate case.

14 ORS Witness Horii elaborates on his concern by referring to Duke Witness
15 Glen Snider in Docket No. 2019-185-E. However, Mr. Snider was the company
16 witness for the avoided cost docket, which does not involve an embedded cost
17 study. Furthermore, his testimony occurred after the base rate cases in Dockets No.
18 2018-319-E and 2018-318-E, and the Companies had already received an order
19 from the Commission stating that the Summer CP method was just and reasonable.
20 Mr. Snider’s testimony is relevant to a marginal cost analysis, but its relevance to
21 the embedded cost analysis used in the 2018 base rate cases is not clear.

² Direct Testimony of Brian Horii p. 19, lines 1-3.

1 **Q. ON PAGE 16, LINES 16 THROUGH 18, ORS WITNESS HORII CLAIMED**
2 **THAT THE EMBEDDED COST TO SERVE STUDIES ARE “IMPORTANT**
3 **FOR EVALUATING THE POLICY ISSUE OF WHETHER THE SOLAR**
4 **CUSTOMERS WOULD BE PAYING THEIR FAIR SHARE OF COSTS.”**
5 **DO YOU AGREE?**

6 A. Yes, ORS Witness Horii and I are aligned on this point given that the purpose of
7 the Embedded Cost to Serve Studies was to determine if customer-generators are
8 paying for their fair share of historic or “embedded” costs under Existing NEM
9 programs. This analysis is central to determining the cost of service implications
10 under Existing NEM programs as required by S.C. Code Ann Section 58-40-
11 20(D)(2)—specifically, whether any cost-shifts or cross-subsidizations arise under
12 those programs.

13 **Q. DO YOU AGREE WITH ORS WITNESS HORII’S RECOMMENDATION**
14 **ON PAGE 15, LINES 20 THROUGH 21, THAT BOTH MARGINAL AND**
15 **EMBEDDED COST STUDIES SHOULD BE USED TO EVALUATE THE**
16 **COMPANIES’ PROPOSED TARIFFS IN THE UPCOMING SOLAR**
17 **CHOICE DOCKET?**

18 A. Yes. Studies using marginal and embedded costs should be used to evaluate the
19 Companies’ proposed tariffs under the Solar Choice Program. If one study is used
20 to the exclusion of the other, it may not provide the Commission with the tools
21 necessary to establish a tariff that fairly allocates costs and benefits in accordance
22 with Act 62. For example, longstanding practice is to use embedded costs to set
23 class revenue requirements that must be recovered through rates, given that these

1 costs reflect what each customer class needs to contribute towards the costs already
2 incurred by the utility. On the other hand, marginal costs are typically utilized by
3 the Companies to structure their rate design and pricing in a way that sends accurate
4 price signals to customers and reflects costs anticipated to be incurred by the
5 Companies as a result of serving such customer.

6 **Q. DO YOU AGREE WITH ORS WITNESS HORII'S STATEMENT ON PAGE**
7 **42, LINES 8 THROUGH 9, THAT THE MARGINAL COST APPROACH IS**
8 **THE MORE APPROPRIATE METHOD TO DETERMINE THE COST-**
9 **SHIFT THAT IS THE FINANCIAL BURDEN SHIFTED TO ALL**
10 **CUSTOMERS BY THE INSTALLATION OF SOLAR OR OTHER**
11 **DISTRIBUTED ENERGY RESOURCES ("DER")?**

12 A. No. A marginal cost analysis is a useful lens to view the cost-shift, but, by itself,
13 it is insufficient, in this context, to satisfy the Commission's mandate under Act 62.
14 Cross-subsidization studies based on marginal and embedded COS studies answer
15 different questions—both of which are valid. Embedded cost studies answer if
16 customer-generators are paying for their fair share of historical costs, while
17 marginal cost studies answer if they will pay for their fair share of future costs.
18 Both future and historical costs are important and need to be considered. Therefore,
19 both marginal and embedded perspectives should be utilized in this proceeding.
20

1 **Q. DO YOU AGREE WITH ORS WITNESS HORII'S STATEMENT ON PAGE**
2 **42, LINES 14 THROUGH 16, THAT EMBEDDED COS STUDIES WILL**
3 **"NOT REPRESENT THE ACTUAL COST SHIFT IMPOSED BY SOLAR**
4 **AND DER, BUT A HYPOTHETICAL COST SHIFT THAT IS RELATIVE**
5 **TO A HYPOTHETICAL EMBEDDED COST SOLAR RATE THAT**
6 **CURRENTLY EXISTS?"**

7 **A.** Both marginal and embedded COS studies rely on modeling and therefore are
8 inherently approximations of the exact cost incurred by the utility to serve each
9 customer. However, there is nothing especially hypothetical about an embedded
10 cost study. Embedded COS studies use methodologies, approved by the
11 Commission, to allocate and estimate historical costs.

12 Quoting the testimony of Company Witness Janice Hager in Docket No.
13 2018-319-E, "The [embedded] cost of service study is based on the official
14 accounting books and records of DE Carolinas... The cost components are
15 comprised of the Company's electric operating expenses and original cost rate base
16 and are based on the historical 12-month period covering January 1, 2017 through
17 December 31, 2017 [referred to as the 'Test Period' for that study]."³ The total
18 costs included in an embedded COS study are not hypothetical, but based on official
19 accounting books.

20 Nevertheless, as previously noted, since any cross-subsidy study is based
21 on modeling, they are inherently hypothetical. In other words, since the electric grid
22 is built and maintained for the entire system and not only one rate class or group of

³ Direct Testimony of Janice Hager p. 5, lines 10-14.

1 customers, any model that attempts to disaggregate costs for groups of customers
2 will inherently be theoretical or “hypothetical.”

3 **Q. CAN YOU PROVIDE SOME ADDITIONAL CONTENT TO RESPOND TO**
4 **ORS WITNESS HORII’S CONCERNS REGARDING THE EMBEDDED**
5 **COST METHDOLOGY WITH REGARDS TO DISTRIBUTION COSTS?**

6 A. An embedded COS is not meant to reflect future cost causation, only the allocation
7 of historically incurred or “embedded” costs. ORS Witness Horii notes that “a COS
8 study needs to allocate costs based on a customer’s maximum use of the grid,
9 whether in the normal (grid power flowing to the customer) or reverse (customer
10 power flowing to the grid) direction.”⁴ The customer’s maximum use of the grid
11 for imports (grid power flowing to the customer) is used in the embedded COS
12 studies from the 2018 rate cases. Distribution costs are allocated based on a sum
13 of estimated residential customer’s maximum demands for imports (the non-
14 coincident allocation method). This allocation methodology is continued in the
15 embedded cost-shift study presented in my direct testimony.

16 **Q. WOULD YOU LIKE TO ADD ANY ADDITIONAL DETAILS TO YOUR**
17 **TESTIMONY ON THE COST-SHIFT FROM CUSTOMER-**
18 **GENERATORS?**

19 A. Yes. Harris Rebuttal Exhibit 1 shows the details of my Embedded Cost to Serve
20 Studies, which shows an estimated cost-shift of \$30-\$41 per month in both DEC
21 and DEP. Harris Rebuttal Exhibit 2 shows the details of my Marginal Cost Studies,
22 which found an estimated monthly cost-shift of \$35 in DEC and \$64 in DEP.

⁴ Direct Testimony of Brian Horii p. 18, lines 12-14.

1 **III. PROPOSAL FOR BENEFIT-COST METHODOLOGY**

2 **Q. DO YOU AGREE WITH SCCCL/SACE/UF/VB/SEIA/NCSEA WITNESS**
3 **BEACH’S TESTIMONY THAT “THE BEST PRACTICES FOR**
4 **DESIGNING BENEFIT-COST ANALYSES OF DERS SHOULD**
5 **EMPHASIZE CONSISTENCY WITH THE SIMILAR ANALYSES WHICH**
6 **HAVE BECOME STANDARD PRACTICE FOR ALL DEMAND-SIDE**
7 **RESOURCES?”**⁵

8 A. Yes, it makes sense that the cost-effectiveness framework already in place for
9 energy efficiency (EE) and demand response (DR) resources can contribute
10 towards evaluating the system benefits of DERs. As discussed in my direct
11 testimony, the valuation of system benefits for solar generation that is not deemed
12 an export (i.e. considered “self-service”) is functionally similar to energy that is the
13 utility does not need to produce due to energy efficiency upgrades. Therefore, the
14 same methods utilized to value the marginal benefits of energy efficiency can be
15 extended to the marginal benefits of self-service solar energy. Any energy that is
16 exported can be valued in the same fashion as energy exported under Schedule
17 Purchased Power. The sum of the value of exported and self-service energy can be
18 compared to the bill reduction to arrive at an estimate of the cross-subsidy from a
19 marginal cost perspective.

20 **IV. CONCLUSION**

21 **Q. DOES THIS CONCLUDE YOUR PRE-FILED REBUTTAL TESTIMONY?**

22 A. Yes, it does.

⁵ Direct Testimony of R. Thomas Beach p. 9, lines 13-15.

Embedded Cost Study
Docket No. 2019-182-E
Summary of Results and Rider Adjustments
For the test year ending December 31, 2017

DEP

RES

Monthly Cross-Subsidy Range	\$30-\$41
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DEC

RS

RE

Weighted

Monthly Cross-Subsidy Range	\$36-\$47	\$23-\$32	\$30-\$40
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DEP				
	RES	RES - High	RES - Low	
Non-Net Metering Annual Cost-of-Service	\$ 1,827.29	\$ 1,827.29	\$ 1,827.29	
Net Metering Annual Cost-of-Service	\$ 1,005.03	\$ 1,035.18	\$ 974.88	
Cost-of-Service Reduction from Solar	\$ 822.26	\$ 792.11	\$ 852.41	
Cost-of-Service Reduction from Solar	\$ 822.26	\$ 792.11	\$ 852.41	
Revenue Reduction	\$ 1,266.28	\$ 1,304.27	\$ 1,228.29	
Payout for Exports	\$ 23.68	\$ 22.97	\$ 24.39	
Net Revenue Reduction	\$ 1,242.60	\$ 1,281.30	\$ 1,203.90	
Annual Solar Cross-Subsidy*	\$ 420.34	\$ 489.19	\$ 351.49	
Monthly Solar Cross-Subsidy*	\$ 35.03	\$ 40.77	\$ 29.29	
Reduction in Solar Cross-Subsidy				

Notes

All-in CoS for Customers before solar. Equals costs calculated in Calculations tab plus rider adjustments

All-in CoS for Customers after solar. Equals costs calculated in Calculations tab plus rider adjustments

Calculated from SAS model, used 2017 data set to match CoS test year, current rates

Removed exports from calculation at unit cost

Revenue reduction not including exports

DEC								
	RS	RS-High	RS- Low	RE	RE-High	RE-Low		
Non-Net Metering Annual Cost-of-Service	\$ 1,593.48	\$ 1,593.48	\$ 1,593.48	\$ 1,593.48	\$ 1,593.48	\$ 1,593.48		
Net Metering Annual Cost-of-Service	\$ 855.23	\$ 880.89	\$ 829.58	\$ 855.23	\$ 880.89	\$ 829.58		
Cost-of-Service Reduction from Solar	\$ 738.25	\$ 712.59	\$ 763.91	\$ 738.25	\$ 712.59	\$ 763.91		
Cost-of-Service Reduction from Solar	\$ 738.25	\$ 712.59	\$ 763.91	\$ 738.25	\$ 712.59	\$ 763.91		
Revenue Reduction	\$ 1,249.30	\$ 1,286.78	\$ 1,211.82	\$ 1,082.94	\$ 1,115.43	\$ 1,050.45		
Payout for Exports	\$ 13.80	\$ 13.39	\$ 14.22	\$ 13.80	\$ 13.39	\$ 14.22		
Net Revenue Reduction	\$ 1,235.50	\$ 1,273.39	\$ 1,197.60	\$ 1,069.14	\$ 1,102.04	\$ 1,036.23		
Annual Solar Cross-Subsidy*	\$ 497.25	\$ 560.80	\$ 433.70	\$ 330.89	\$ 389.45	\$ 272.33		
Monthly Solar Cross-Subsidy*	\$ 41.44	\$ 46.73	\$ 36.14	\$ 27.57	\$ 32.45	\$ 22.69		
Reduction in Cross-Subsidy								

	RS	RE	Weighted Avg - High	Weighted Avg - Low
Percent of Population		55%	45%	
Weighted Solar Cross-Subsidy		\$ 43.82	\$ 40.31	\$ 30.09
Weighted Reduction in Solar Cross-Subsidy				

Rider Adjustments - DEC		Notes
EE/EDIT	\$ 0.000946	
Fuel Adjustment from 2017-9/20	\$ (0.002664)	Embedded unit costs include fuel rate from 2017, need to update to rates as of 10/1/20 = 0.016102-0.018769
Monthly Leaf 50C Charge	0.64	

Rider Adjustments - DEP		Notes
DSM/EE	\$ 0.00671	
Fuel Adjustment from 2017-9/20	\$ (0.00282)	Embedded unit costs include fuel rate from 2017, need to update to rates as of 7/1/20 = 0.02456-0.03087
EDIT	\$ (0.00349)	
Rider 39 Charge	\$ 1.00	

	Current NEM Policy	Settlement
Excess Exports kWh (i.e. kWh credited at avoided cost rate)	595	2,918

Embedded Cost Study

Docket No. 2019-182-E

Calculation of Cost to Serve Without Adjustments

For the test year ending December 31, 2017

Unit Costs				
	unit	DEP	DEC	
P&T Demand	\$/kW-Month	\$ 16.91		
D Demand	\$/kW-Month	\$ 1.23	\$ 1.94	
P Demand	\$/kW-Month		\$ 15.31	
T Demand	\$/kW-Month		\$ 1.33	
Energy	\$/kWh	\$ 0.0398	\$ 0.0232	
Customer	\$/Month	\$ 27.46	\$ 24.85	

DEP							DEC						
No Solar							No Solar						
Month	Energy	D Demand	P&T Demand	Customer	Total COS		Month	Energy	D Demand	T Demand	P Demand	Customer	Total COS
1	\$ 48.59	\$ 12.68	\$ 62.24	\$ 27.46	\$ 150.97		1	\$ 28.33	\$ 20.03	\$ 4.89	\$ 56.35	\$ 24.85	\$ 134.44
2	\$ 36.11	\$ 12.68	\$ 62.24	\$ 27.46	\$ 138.49		2	\$ 21.05	\$ 20.03	\$ 4.89	\$ 56.35	\$ 24.85	\$ 127.17
3	\$ 42.18	\$ 12.68	\$ 62.24	\$ 27.46	\$ 144.56		3	\$ 24.59	\$ 20.03	\$ 4.89	\$ 56.35	\$ 24.85	\$ 130.71
4	\$ 36.17	\$ 12.68	\$ 62.24	\$ 27.46	\$ 138.55		4	\$ 21.08	\$ 20.03	\$ 4.89	\$ 56.35	\$ 24.85	\$ 127.20
5	\$ 44.35	\$ 12.68	\$ 62.24	\$ 27.46	\$ 146.73		5	\$ 25.85	\$ 20.03	\$ 4.89	\$ 56.35	\$ 24.85	\$ 131.97
6	\$ 56.57	\$ 12.68	\$ 62.24	\$ 27.46	\$ 158.95		6	\$ 32.98	\$ 20.03	\$ 4.89	\$ 56.35	\$ 24.85	\$ 139.09
7	\$ 74.13	\$ 12.68	\$ 62.24	\$ 27.46	\$ 176.52		7	\$ 43.22	\$ 20.03	\$ 4.89	\$ 56.35	\$ 24.85	\$ 149.34
8	\$ 66.29	\$ 12.68	\$ 62.24	\$ 27.46	\$ 168.68		8	\$ 38.65	\$ 20.03	\$ 4.89	\$ 56.35	\$ 24.85	\$ 144.76
9	\$ 48.57	\$ 12.68	\$ 62.24	\$ 27.46	\$ 150.96		9	\$ 28.32	\$ 20.03	\$ 4.89	\$ 56.35	\$ 24.85	\$ 134.43
10	\$ 40.36	\$ 12.68	\$ 62.24	\$ 27.46	\$ 142.74		10	\$ 23.53	\$ 20.03	\$ 4.89	\$ 56.35	\$ 24.85	\$ 129.65
11	\$ 41.82	\$ 12.68	\$ 62.24	\$ 27.46	\$ 144.21		11	\$ 24.38	\$ 20.03	\$ 4.89	\$ 56.35	\$ 24.85	\$ 130.50
12	\$ 56.61	\$ 12.68	\$ 62.24	\$ 27.46	\$ 158.99		12	\$ 33.00	\$ 20.03	\$ 4.89	\$ 56.35	\$ 24.85	\$ 139.12
Total	\$ 591.76	\$ 152.18	\$ 746.94	\$ 329.46	\$ 1,820.34		Annual Total	\$ 344.98	\$ 240.32	\$ 58.67	\$ 676.24	\$ 298.18	\$ 1,618.39
Energy D Demand P&T Demand Customer Total COS							Energy D Demand T Demand P Demand Customer Total COS						
CoS Savings	\$ 191.39	\$ 9.13	\$ 635.30	\$ -	\$ 835.82		CoS Savings	\$ 111.58	\$ 14.41	\$ 49.91	\$ 575.17	\$ -	\$ 751.06
% Savings	32%	6%	85%	0%	46%		% Savings	32%	6%	85%	85%	0%	46%
Net Metering							Net Metering						
Month	Energy	D Demand	P&T Demand	Customer	Total COS		Month	Energy	D Demand	T Demand	P Demand	Customer	Total COS
1	\$ 40.06	\$ 11.92	\$ 9.30	\$ 27.46	\$ 88.74		1	\$ 23.36	\$ 18.83	\$ 0.73	\$ 8.42	\$ 24.85	\$ 76.18
2	\$ 26.41	\$ 11.92	\$ 9.30	\$ 27.46	\$ 75.09		2	\$ 15.40	\$ 18.83	\$ 0.73	\$ 8.42	\$ 24.85	\$ 68.22
3	\$ 29.37	\$ 11.92	\$ 9.30	\$ 27.46	\$ 78.05		3	\$ 17.12	\$ 18.83	\$ 0.73	\$ 8.42	\$ 24.85	\$ 69.95
4	\$ 22.83	\$ 11.92	\$ 9.30	\$ 27.46	\$ 71.51		4	\$ 13.31	\$ 18.83	\$ 0.73	\$ 8.42	\$ 24.85	\$ 66.14
5	\$ 26.41	\$ 11.92	\$ 9.30	\$ 27.46	\$ 75.09		5	\$ 15.39	\$ 18.83	\$ 0.73	\$ 8.42	\$ 24.85	\$ 68.22
6	\$ 33.02	\$ 11.92	\$ 9.30	\$ 27.46	\$ 81.70		6	\$ 19.25	\$ 18.83	\$ 0.73	\$ 8.42	\$ 24.85	\$ 72.08
7	\$ 43.20	\$ 11.92	\$ 9.30	\$ 27.46	\$ 91.88		7	\$ 25.18	\$ 18.83	\$ 0.73	\$ 8.42	\$ 24.85	\$ 78.01
8	\$ 41.35	\$ 11.92	\$ 9.30	\$ 27.46	\$ 90.03		8	\$ 24.11	\$ 18.83	\$ 0.73	\$ 8.42	\$ 24.85	\$ 76.93
9	\$ 30.39	\$ 11.92	\$ 9.30	\$ 27.46	\$ 79.06		9	\$ 17.71	\$ 18.83	\$ 0.73	\$ 8.42	\$ 24.85	\$ 70.54
10	\$ 28.48	\$ 11.92	\$ 9.30	\$ 27.46	\$ 77.16		10	\$ 16.61	\$ 18.83	\$ 0.73	\$ 8.42	\$ 24.85	\$ 69.43
11	\$ 32.29	\$ 11.92	\$ 9.30	\$ 27.46	\$ 80.97		11	\$ 18.82	\$ 18.83	\$ 0.73	\$ 8.42	\$ 24.85	\$ 71.65
12	\$ 46.56	\$ 11.92	\$ 9.30	\$ 27.46	\$ 95.24		12	\$ 27.14	\$ 18.83	\$ 0.73	\$ 8.42	\$ 24.85	\$ 79.97
Total	\$ 400.37	\$ 143.06	\$ 111.63	\$ 329.46	\$ 984.52		Annual Total	\$ 233.40	\$ 225.91	\$ 8.77	\$ 101.07	\$ 298.18	\$ 867.33

Embedded Cost Study
Docket No. 2019-182-E
Billing Determinants
For the test year ending December 31, 2017

Month	Sum of Exports	Sum of Imports	Sum of Self-Consumption	Gross Load (kWh)	Solar Production
1	399	1,007	203	1,221	601
2	655	664	230	907	885
3	890	738	312	1,060	1,202
4	857	574	329	909	1,186
5	872	664	443	1,114	1,315
6	731	830	588	1,421	1,319
7	674	1,085	770	1,863	1,445
8	569	1,039	622	1,666	1,191
9	693	764	445	1,221	1,138
10	666	716	287	1,014	954
11	463	811	232	1,051	695
12	338	1,170	248	1,422	586
Total	7,807	10,060	4,709	14,870	12,516

Non-Coincident Peaks**Description**

No Solar	10.34
Solar	9.72

Coincident Peaks

	DEP	DEC
Date & Time	7/13/17 5pm	8/17/17 3pm
No Solar	no data	3.68
Solar	no data	0.55

Note: because load data was only available for DEC, DEC peak determinants were used for both utilities.
The DEP peaks are listed above only for reference.

HARRIS REBUTTAL EXHIBIT 1

Page 5

DEC Functional Revenue by Rate
Docket No. 2019-182-E
SC RETAIL COST OF SERVICE - PROPOSED - 1CP - COMPLIANCE FILING
From Docket No. 2018-319-E
For the test year ending December 31, 2017
Dollars in Thousands

Dollars in Thousands

RATE	TOTAL	Production Demand	Production Energy	Transmission	DISTRIBUTION										DNCP	DNCP
					Dist-Substations	Dist-Pole,Tow,Fix	Dist-Conductors	Dist-Transformers	Dist-Other Local	OTHER	Total Distr Demand	Dist-Customer	Total Distribution			
a	b	c	d	e	f	g	h	i	b	j	k	l	m	n		
RS1	394,586	176,840	75,977	15,347	10,042	8,081	16,712	9,770	27	76,818	44,632	81,790	126,422	1,892,350	4.32	
RT	638	304	156	26	15	11	25	14	0	-	65	86	151	3,009	2.17	
RE1	307,307	118,006	68,096	10,236	10,273	7,826	17,117	9,470	361	28,983	45,048	65,921	110,969	1,966,086	2.28	
Total RS	702,531	295,151	144,229	25,609	20,331	15,919	33,854	19,253	388	105,802	89,745	147,797	237,542			
TOTAL RETAIL	1,706,789	787,120	486,938	68,908	36,659	29,741	63,254	27,612	22,589	#N/A	179,855	183,968	363,823	6,987,517	2.57	

	Cost (not in thousands)	Annual Units	Unit Cost per Month
Customer	\$ 147,797,289	5,947,908	\$ 24.85
P Demand	\$ 295,150,765	1,606,176	\$ 15.31
T Demand	\$ 25,609,064	1,606,176	\$ 1.33
D Demand	\$ 89,745,114	3,861,445	\$ 1.94
Energy	\$ 144,228,770	6,206,954,000	\$ 0.0232
overall total	\$ 702,531,002		

Total RS

MWHS AT METER

MWHS at Meter 6,206,954

NON-COINCIDENT PEAK

NCP 3,861,445

NUMBER OF CUSTOMERS

Number of Customers 495,659
(not in thousands)

PRODUCTION DEMAND

Production Demand 1,606,176 Source: DEC Allocators from SC Retail Cost of Service- Proposed - 1CP - Compliance Filing

DEP Functional Revenue By Rate

Docket No. 2019-182-E

From DOCKET NO. 2018-218-E "ADJUSTED BY FUNCTION WITH COMPLIANCE RATES ANNUALIZED"

SOUTH CAROLINA RETAIL COST OF SERVICE STUDY

ADJUSTED TEST YEAR ENDING DECEMBER 31, 2017

UNIT DETAIL - REVENUES	Unit Cost Classification	SC RETAIL	SC RES excl TOU	SC RES TOU
FUNCT REQ'TS RATE SCHED REV incl. ASK: Incr. (Decr.)				
PROD_DEMAND	Product & Trans Demand	221,794,781	84,460,810	1,588,673
PROD_ENERGY	Energy	226,470,785	78,726,632	1,595,259
TRANSMISSION	Product & Trans Demand	24,061,158	8,765,785	159,600
DIST_SUBS	Distribution Demand	10,954,293	5,482,623	81,806
DIST_PRIMARY	Distribution Demand	12,047,505	6,631,195	99,719
DIST_L_XFMR	Distribution Demand	6,125,895	3,323,302	49,077
DIST_SEC_SERV	Distribution Demand	19,883,544	2,572,841	38,711
CUSTOMER	Customer	56,469,352	44,228,779	560,089
Total		577,807,313	234,191,968	4,172,933
Billing Determinants	Summer CP kW (DP adj @ meter)	1,610,108	458,926	8,994
	Adj kWh Sales (E2 at meter)	8,241,813,840	1,978,209,443	40,124,603
	Year End No. Cust (C1)	304,233	134,234	1,712

SC Res NCP CY 2017 1,241,969

	Unit Cost	Notes
Customer (\$/month)	\$ 27.46	Costs/Number of Customers
Distribution Demand (\$/kW-Month)	\$ 1.23	Costs/SC Res NCP CY 2017/12
Production and Trans Demand (\$/kW-Month)	\$ 16.91	Costs/Summer CP kW
Energy (\$/kWh)	\$ 0.03980	Costs/Adj kWh Sales

DEP

RES Marginal Cost	\$	64
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DEC

RS Marginal Cost	\$	43
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RE Marginal Cost	\$	25
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Weighted Average Marginal Cost	\$	35
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	2021 DEC-SC System Benefits for RS Customers			
	Total NEM	Self-Service NEM	NEM Exports	
Annual kWh Production	10,907	10,316	591	
Avoided costs use prevailing values from DSM/EE mechanism				
Avoided Electric Production	\$286	\$270	\$15	
Avoided Electric Capacity	\$40	\$40	\$0	
Avoided Electric T&D	\$355	\$355	\$0	
2021 Total Benefits	\$681	\$665	\$15	

Notes

kWh comprised by self-service (consumed behind the meter) or exported on a monthly basis.

Includes Fuel + O&M to produce kWh

New Plant

New Transmission and Distribution

	RS Current
Total Benefits	\$681
Revenue Reduction	\$1,197
Monthly Cross-Subsidy	\$43

Derived from SAS model of CY2019 NEM data

	2021 DEC-SC System Benefits for RR Customers			
	Total NEM	Self-Service NEM	NEM Exports	
Annual kWh Production	13,209	12,547	662	
Avoided costs use prevailing values from DSM/EE mechanism				
Avoided Electric Production	\$346	\$329	\$17	
Avoided Electric Capacity	\$40	\$40	\$0	
Avoided Electric T&D	\$355	\$355	\$0	
Total Benefits	\$741	\$724	\$17	

Notes

kWh comprised by self-service (consumed behind the meter) or exported on a monthly basis.

Includes Fuel + O&M to produce kWh

New Plant

New Transmission and Distribution

	RE Current
Total Benefits	\$741
Revenue Reduction	\$1,037
Monthly Cross-Subsidy	\$25

Derived from SAS model of CY2019 NEM data

	DEC-SC NPV 2021\$		
	Total NEM	Self-Service NEM	NEM Exports
Annual kWh Savings	12,427	11,378	1,049
Avoided costs use prevailing values from DSM/EE mechanism			
Avoided Electric Production	\$313	\$286	\$26
Avoided Electric Capacity	\$2	\$2	
Avoided Electric T&D	\$124	\$124	
Total Benefits	\$438	\$412	\$26

Notes

kWh comprised by self-service (consumed behind the meter) or exported on a monthly basis.

Includes Fuel + O&M to produce kWh

New Plant

New Transmission and Distribution

	RES Current
Total Benefits	\$438
Revenue Reduction	\$1,211
Monthly Cross-Subsidy	\$64

Derived from SAS model of CY2019 NEM data